Bombus lignsticus; *Chalicodonia muraria*; *Pedanaspis crassitarsis*, Costa: *Salius fuscus*, ♀, L.; *Athalia glabricollis*; *Bombus sylvarum*; *Tenthredopsis excisa*; *Xylocopa cyanescens*; *Proanthidium laterale*, Latr. =*4-lobum*, Per.; *Odynerus parietum*, L.; *Tenthredopsis litterata*, Geoffr.; *Allantus dahlii*, Klug.: *A. bifasciatus*, Müll.: *A. amaenus*, Gravenhorst =*cingulum*, Kl.; *Osmia kohli*, Ducke; *O. tricornis*, Latr.; *Oryssidae*: *Oryssus abietinus*, Scop.; scarce in collections, life-history required to be described; *Psammochares fuscus*, L.; *P. riaticus*, Fabr.; *Macrophya blanda*, F.; *Xylocopa cyanescens*, Brullé.; *Andrena morio*; *Nomada succincta*; *Gorytes mystaceus*; *Osmia pilicornis*; *Arge enodis*; *Anthophora megilla*; *A. fulvitarsis* var. *scopipes*, Spin.; *Anthophora retusa*, var. *nigra*. These were all taben in the environs of Digne.

(*To be concluded.*)

Note on the Antiquity of some Orthopterous Groups.

By MALCOLM BURR, D.Sc., F.E.S.

Although the fossil orthopterous and orthopteroid insects have been studied in some detail, there is an aspect of the geological side of Orthopterology which I have seldom noticed referred to, perhaps due to lack of familarity with recent literature. There are two points that have struck me as of extreme interest and I think they are worth putting on record in the hope of stimulating students to further investigation.

Probably everyone, who has collected in Spain, is familiar with a numerous group of big, fat, sluggish grasshoppers, which are common in bushes all over the peninsula, called the *Ephippigeridae*; they are obese, with big, round heads, staring eyes, plump abdomen and no wings, while the elytra are reduced to mere stridulating instruments. There are probably about a hundred species, and if their distribution be plotted on the map, it covers an area shaped like a horseshoe with the centre about Gibraltâr, the two arms extending westwards on the two sides of the Mediterranean; the main mass extends to the Atlas on the south and to the Pyrenees on the north, whence they thin out towards the west; in Europe, two or three species reach the coast of Dalmatia, and one only, the advance guard of a perhaps extending group, reaches northern France, central Europe and as far east as the middle of Russia. There are several other groups by no means closely allied which have similar general characteristics, evidently a case of parallel development, such as the *Bradyporidae* of the Pontic fauna, the *Zichyas* of Central Asia, and the *Hetrodidae* of Africa, though the latter are fairly close to the *Ephippigeridae*. Apart from purely structural features, the *Ephippigeridae* have the peculiarity that both sexes chirp equally well, and that they stridulate with anger when handled, as well as from sheer *joie de vivre*.

The most characteristic species in Spain is *E. perezi*, one of the largest and widest spread in the Iberian Peninsula. In the Balearic Islands, at least in Majorca, there is a species, *E. balearica*, which is so closely allied that it is hardly more than a local form, distinguishable only by a slightly different shape of the pronotum.

Now it is agreed among geologists that the Balearic Islands were

separated from the mainland of southern Spain during the Oligocene Period, when great earth movements formed the Straits of Gibraltar and connected up southern Spain with the mainland of Europe. Consequently, the Balearic Ephippigers have been isolated from the main stock since the Oligocene and yet during this great lapse of time, they have only developed a trifling physical difference. Even if we admit that their isolated position has protected them from the intensity of the struggle for existence which has been keener on the mainland, we are compelled to ask how long it has taken to develop the four or five score of species, with several genera, and to conclude that the family itself must be of very ancient origin.

The other case occurs among the earwigs. There is a small subfamily called the *Esphalmeninae*, with but a single genus comprising about half a dozen species. They are flightless creatures and flattened, probably living under stones; their abdomen is dilated posteriorly, sometimes remarkably so; in these characteristics they resemble several other groups, especially the *Psalidae*; a clear case of parallel development. But they are sharply distinguished by the marked narrowing of the prosternum posteriorly, and above all by the peculiar and complex development of the male genital armature. They are characteristic of the Andes, from Patagonia to Ecuador and are rare in collections. But there is one species, *E. peringueyi*, from the Caledon River, Cape Colony.

When I first referred this species to this genus Zacher wrote me that surely I must be mistaken, as I had acted upon external features only. I was then lucky enough to secure some material in alcohol and so able to examine the genitalia, and this completely vindicated my determination; the armature was extremely close to the known armatures of the Andean forms and quite different from any other type known in the Dermaptera. The South African species is an undoubted Esphalmenid and very closely related to the Andean species, the differences being not greater than specific.

Now there is much evidence to show that the southern portion of Africa, the Falkland Islands and part of South America were part of one continent through vast ages of geological time, at least from the Lower Carboniferous to the end of the Trias, when it seems that they were separated. If that is so, *E. peringueyi* has been separated from its congeners since the end of the Trias, during which vast interval of time it has developed only specific characters; how great, then, must have been the lapse during which the subfamily developed its identity, and how ancient it must be, and how inconceivably old must be the splitting of the Proto-from the Eu-dermaptera and the evolution of the earwigs as a group. The Tertiary earwigs of Florissant, described and figured by Scudder, have apparently a decidedly archaic appearance, though the earwigs preserved so perfectly in Oligocene amber in the Baltic have a very up-to-date look. Yet the *Esphalmeninae* of the Trias must hardly have been different from those of to-day.

Very numerous cases of like nature among the Orthoptera could doubtless be quoted; it seems certain that the existing distinctive groups of the Orthoptera are extremely ancient. But so few are preserved in fossil form that it is only by a study of their geographical distribution that we can form a conception of their antiquity.

Our general knowledge of the orthopterous fauna of the world has made great strides in recent years and it is not now premature to attempt generalisation on this fascinating, but so far much neglected, aspect of Orthopterology.

NOTES ON COLLECTING, etc.

References for Collecting in the Engadine area:—

Engadine:—*Ent. Rec.* XXVII. 163, etc. *Ent. Mo. Mag.* XXXIV. 25: XLIV. 238. *Ent.* XVIII. 307.

Pontresina:—*Ent. Rec.* XIX. 43: XX. 193: XXIV. 266: XXVI. 228, etc. *Ent. Mo. Mag.* XXXVII. 130, etc.: *Ent.* VII. 77.

St. Moritz:—*Ent. Rec.* XXIV. 87.

Bernina Pass:—*Ent. Rec.* XXIV. 88: XXVI. 243.

Guarda:—*Ent. Rec.* XXI. 166.

Albula Pass:—*Ent. Rec.* XIX. 43: XXIV. 41.

Maloya Pass:—*Ent. Rec.* XIX. 42.

Rosegg Thal:—*Ent. Rec.* XIX. 43: XX. 194.

Zernetz:—*Ent. Rec.* XXI. 197.

Suvretta Thal:—*Ent. Rec.* XIX. 44.—H.J.T.

Hibernated Polygonia c-album.—It may be of interest to note that hibernated *P. c.-album*, have appeared in my garden to-day, March 17th, and also *Gonepteryx rhamni*.—Peter Haig-Thomas, F.E.S., The Grange, Goring-on-Thames.

Micro-Lepidoptera of the British Isles.—May I suggest that a new list of the so-called "micros" would fill a long felt want and would probably pay for the trouble and expense.—(Lieut.) S. A. Jones, "Biskra," New Milton, Hants.

[Much as we should welcome this project we doubt whether at the present time a dozen copies would be sold. The number of those who are interested in the "micros" is almost negligible. It is very rarely that "micros" are exhibited in our societies except now and again a species which has demonstrated its power to be of economic importance.—Hy.J.T.]

A humorous experiment with Processional Caterpillars.—The *Evening News* in its issue of February 12th, describes an amusing experiment played upon the Colony of these insects at the Zoological Gardens, which is perhaps worth recording in a less ephemeral journal. On the occasion of one of their periodical route marches the experiment was made of linking up the head of the procession to the tail by means of the guiding silk thread laid by the leader, with the result that, although the leading caterpillar may have been somewhat surprised at finding himself unexpectedly at the rear of his column, he did not hesitate, but loyally followed on and so the caterpillars solemnly tramped round and round for a day-and-a-half. When tired they are stated to have simply curled up where they were, and on waking to have resumed their rotatory peregrination, and that though food was plentiful, apparently they ignored it. The end of this rotatory walk would obviously have proved disastrous had not one caterpillar fallen out from exhaustion, and in his fall carried away some of the guiding thread, with the result that, before he could resume his place, he had